from the bar code. In other embodiments, the bar code encodes coupon information.

Referring to FIG. 17, a coupon 410 includes a bar code 412, text 414 describing the coupon value (5% discount on the purchase price), and text 416 describing the validity period. The bar code 412 represents a sequence of digits, and the sequence is described by text 418. The sequence of digits in the illustrated example is "881000599", and in this embodiment the sequence encodes coupon information. Thus the coupon information is directly stored on the coupon, which can be more efficient in certain situations. For example, if the coupon itself stores required information, the coupon may be read by any machine that is able to interpret the encoding scheme used in creating the bar code. Thus, stores would not need to be in communication with a central database that stores the coupon information, and consequently a large variety of unrelated businesses would be able to read and redeem the coupon.

Referring to FIG. 18, the sequence of digits "881000599" printed on the coupon 410 (FIG. 17) is illustrated in further detail and indicated by reference numeral 440. The sequence of digits 440 can represent one or more values, and the representation described by FIG. 18 is but one example. A portion 442 of the sequence of digits 440 indicates the encoding scheme, which is described in more detail below. A portion 444 of the sequence of digits 440 indicates the percentage discount that is to be applied to the purchase price. Thus, the portion 444 defines the coupon value. A portion 446 comprises unused digits in the indicated encoding scheme.

Referring to FIG. 19, the encoding scheme database 32 includes entries 462, 464 and 466. Each entry defines how different information is indicated by the different digits of the bar code. Each entry includes (i) an encoding scheme identifier 468 that uniquely identifies the encoding scheme; and (ii) a description 470 of the corresponding encoding scheme. In the illustrated embodiment, the encoding scheme identifier is the first three digits of the bar code. For example, referring again to FIG. 19, the portion 442 indicates an encoding scheme "881". As shown by the entry 464, in the encoding scheme "881" the fourth through seventh digits (the portion 444 of FIG. 18) indicate a percentage discount applied to the purchase price. The entry 464 also shows that in the encoding scheme "881" the digits after the seventh digit are ignored, and so contain no further coupon information.

Alternatively, the identifier that is printed on the coupon may comprise text, rather than a bar code. For example, the coupon may include text that describes the coupon value and/or coupon features. A cashier operating the POS terminal could read the text, and in turn actuate appropriate keys of the POS terminal to indicate the coupon value.

As described above, upon acceptance by the customer, the coupon is printed and exchanged for change due (round-up amount). It can be desirable to print an indication of the change due on the coupon. Such an indication would permit the coupon to be readily returned for the round-up amount, which is the amount the customer originally "paid" for the coupon. For example, a customer may reconsider his acceptance and wish to have his change instead of the coupon. If the coupon includes an indication of the round-up amount, there is little ambiguity about what the customer paid for the coupon.

Referring to FIG. 20, a method 490 is performed by a POS terminal in generating a coupon. The POS terminal generates a purchase price and a rounded price (steps 492 and

194) and calculates a round-up amount therefrom (step 496). If the customer accepts the offer, the POS terminal prints on the coupon an indication of the round-up amount (step 498), and the coupon is exchanged for the round-up amount (step 500).

If the customer reconsiders, he can later return the coupon. The indication of the round-up amount that is printed on the coupon is received by the POS terminal (step 502). For example, the indication of the round-up amount may be encoded in the bar code, determinable from the bar code, or printed separately on the coupon. The bar code or other printing could be scanned by the POS terminal or entered via the input device 16. Once the POS terminal receives the indication and therefrom determines the round-up amount due to the customer, the round-up amount is exchanged for the coupon (step 504).

When the coupon is exchanged for the round-up amount, and vice-versa, the POS terminal may maintain an audit trail regarding the number of coupons that should have been received, and the amount of money that should have been received. Such an audit trail is useful in deterring and detecting fraud. Various auditing procedures will be understood by those skilled in the art.

It can be further desirable to encrypt the indication of the round-up amount to reduce the threat of counterfeit coupons. For example, if the indication of the round-up amount is merely text such as "$0.45", the coupon could be easily duplicated repeatedly. However, if the round-up amount is encrypted, counterfeiting becomes more difficult. Many encryption and decryption techniques are well known, and described in the text "Applied Cryptography, Protocols, Algorithms, and Source Code in C", Second Edition, by Bruce Schneier.

Also, if each coupon includes at least one unique identifier, thereby allowing redemption of each coupon to be tracked, then redemption of any counterfeit coupons may be more easily detected and reduced. In addition, if valid identifiers cannot be readily determined from other valid identifiers, fraud is further deterred.

When coupons are redeemed, it can be advantageous to store an indication of such redemption. If the coupon is redeemed, an indication of such redemption can be stored for later use. For example, based on historic redemption of particular coupons, different coupons may be offered.

Although the present invention has been described with respect to a preferred embodiment thereof, those skilled in the art will note that various substitutions may be made to those embodiments described herein without departing from the spirit and scope of the present invention. For example, many conditions may be used besides those conditions described in detail herein.

What is claimed is:

1. A method for generating a coupon, comprising:
   generating a purchase price of a purchase;
   generating a rounded price;
   calculating a round-up amount, the round-up amount being a difference between the purchase price and the rounded price; and
   printing on the coupon an identifier based on the round-up amount.

2. A method for generating a coupon, comprising:
   generating a purchase price of a purchase;
   generating a rounded price;
   calculating a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;

setting a coupon value based on the round-up amount; and

printing on the coupon an identifier that is based on the coupon value.

3. The method of claim 2 further comprising:

setting a coupon feature based on a condition; and in which the step of printing comprises
printing an identifier that is based on the coupon value and the coupon feature.

4. The method of claim 3 in which the coupon feature is a validity period.

5. The method of claim 4 in which the step of setting a coupon feature based on a condition comprises:

determining a time of a previous transaction;

determine a time interval since the previous transaction; and

setting the validity period based on the time interval since the previous transaction.

6. The method of claim 5 in which the step of setting the validity period based on the time interval since the previous transaction comprises

setting the validity period to be shorter than the time interval since the previous transaction.

7. The method of claim 5 further comprising:

receiving a customer identifier; and in which the step of determining a date of a previous transaction comprises:
determining a date of a previous transaction that is based on the customer identifier.

8. The method of claim 4 in which the step of setting a coupon feature based on a condition comprises:

determining a current time; and

setting the validity period based on the current time.

9. The method of claim 8 in which the step of setting the validity period based on the current time comprises:

setting the validity period to exclude an interval that corresponds to the current time.

10. The method of claim 3 in which the coupon feature is a required item.

11. The method of claim 10 in which the step of setting a coupon feature based on a condition comprises:

receiving a customer identifier;

determining a coupon redemption that is based on the customer identifier; and

setting the required item based on the coupon redemption.

12. The method of claim 11 in which the step of setting the required item based on the coupon redemption comprises:

setting the required item to be a predetermined item if the coupon redemption is greater than a predetermined threshold.

13. The method of claim 11 in which the step of setting the required item based on the coupon redemption comprises:

determining an infrequent item that is based on the customer identifier; and

setting the required item to be the infrequent item if the coupon redemption is greater than a predetermined threshold.

14. The method of claim 10 in which the step of setting a coupon feature based on a condition comprises:

receiving a customer identifier;

determining a number of past purchases of an item, the number being based on the customer identifier; and

setting the required item based on the number of past purchases of the item.

15. The method of claim 2 in which the step of setting a coupon value based on the round-up amount comprises:

setting the coupon value based on the round-up amount and a condition.

16. The method of claim 15 in which the step of setting the coupon value based on the round-up amount and a condition comprises:

determining whether the purchase includes coupon redemption;

setting the coupon value to a first value if the purchase includes coupon redemption;

setting the coupon value to a second value if the purchase does not include coupon redemption, the second value being greater than the first value, the first value and the second value being based on the round-up amount.

17. The method of claim 15 in which the step of setting the coupon value based on the round-up amount and a condition comprises:

determining a payment type; and

setting the coupon value based on the payment type.

18. The method of claim 17 in which the step of setting the coupon value based on the round-up amount and a condition comprises:

determining whether a payment type is currency;

setting the coupon value to a first value if the payment type is currency; and

setting the coupon value to a second value if the payment type is not currency, the second value being greater than the first value, the first value and the second value being based on the round-up amount.

19. The method of claim 15 in which the step of setting the coupon value based on the round-up amount and a condition comprises:

determining whether a frequent shopper identifier is received;

setting the coupon value to a first value if a frequent shopper identifier is received; and

setting the coupon value to a second value if no frequent shopper identifier is received, the second value being greater than the first value, the first value and the second value being based on the round-up amount.

20. The method of claim 15 in which the step of setting the coupon value based on the round-up amount and a condition comprises:

receiving a customer identifier;

determining a coupon redemption that is based on the customer identifier; and

setting the coupon value based on the coupon redemption.

21. The method of claim 20 in which the step of setting the coupon value based on the coupon redemption comprises:

determining a number of transactions based on the customer identifier;

determining a number of coupons redeemed based on the customer identifier;

calculating a redemption rate based on the number of coupons redeemed and the number of transactions; and

setting the coupon value based on the redemption rate.

22. The method of claim 15 in which the step of setting the coupon value based on the round-up amount and a condition comprises:

receiving a customer identifier;

determining an acceptance rate that is based on the customer identifier; and

setting the coupon value based on the acceptance rate.

23. The method of claim 15 in which the step of setting the coupon value based on the round-up amount and a condition comprises:

receiving a customer identifier;

determining a number of transactions that is based on the customer identifier; and

setting the coupon value based on the number of transactions.

24. The method of claim 23 in which the step of setting the coupon value based on the number of transactions comprises:

setting the coupon value to a first value if the number of transactions does not correspond to a multiple of a predetermined number; and

setting the coupon value to a second value if the number of transactions corresponds to a multiple of a predetermined number, the second value being greater than the first value, the first value and the second value being based on the round-up amount.

25. The method of claim 15 in which the step of setting the coupon value based on the round-up amount and a condition comprises:

receiving a customer identifier;

determining a number of coupons redeemed that is based on the customer identifier; and

setting the coupon value based on the number of coupons redeemed.

26. The method of claim 25 in which the step of setting the coupon value based on the number of coupons redeemed comprises:

setting the coupon value to a first value if the number of coupons redeemed does not correspond to a multiple of a predetermined number; and

setting the coupon value to a second value if the number of coupons redeemed corresponds to a multiple of a predetermined number, the second value being greater than the first value, the first value and the second value being based on the round-up amount.

27. The method of claim 2, in which the identifier comprises a bar code.

28. The method of claim 27, further comprising:

encoding the coupon value in the bar code.

29. The method of claim 27, further comprising:

encoding a coupon feature in the bar code.

30. The method of claim 2, further comprising:

storing the coupon value in a record that is determinable from the identifier.

31. A method for generating a coupon, comprising:

generating a purchase price of a purchase;

generating a rounded price;

calculating a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;

printing on the coupon an indication of the round-up amount;

printing on the coupon an indication of an upsell;

receiving an indication of the round-up amount on a coupon; and

exchanging the round-up amount for the coupon.

32. The method of claim 31 in which the indication of a round-up amount comprises a bar code.

33. A method for generating a coupon, comprising:

generating a purchase price of a purchase;

generating a rounded price;

calculating a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;

setting a coupon value based on a predetermined multiple of the round-up amount; and

printing on the coupon an identifier that is based on the coupon value.

34. The method of claim 33 in which the step of setting a coupon value based on a predetermined multiple of the round-up amount comprises:

setting the coupon value to three times the round-up amount.

35. A method for generating a coupon, comprising:

generating a purchase price of a purchase;

generating a rounded price;

calculating a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;

determining whether the purchase includes coupon redemption; and

if the purchase includes coupon redemption,

setting a coupon value based on the round-up amount, and

printing on the coupon an identifier that is based on the coupon value.

36. An apparatus for generating a coupon, comprising:

a storage device; and

a processor connected to the storage device,

the storage device storing a program for controlling the processor; and

the processor operative with the program to:

generate a purchase price of a purchase;

generate a rounded price;

calculate a round-up amount, the round-up amount being a difference between the purchase price and the rounded price; and

print on the coupon an identifier based on the round-up amount.

37. An apparatus for generating a coupon, comprising:

a storage device; and

a processor connected to the storage device,

the storage device storing a program for controlling the processor; and

the processor operative with the program to:

generate a purchase price of a purchase;

generate a rounded price;

calculate a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;

set a coupon value based on the round-up amount; and

print on the coupon an identifier that is based on the coupon value.

38. An apparatus for generating a coupon, comprising:

a storage device; and

a processor connected to the storage device,

the storage device storing a program for controlling the processor; and

the processor operative with the program to:

generate a purchase price of a purchase;

generate a rounded price;

calculate a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;

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print on the coupon an indication of the round-up amount;

print on the coupon an indication of an upsell;

receive an indication of the round-up amount on a coupon; and

exchange the round-up amount for the coupon.

39. An apparatus for generating a coupon, comprising:

a storage device; and

a processor connected to the storage device,

the storage device storing a program for controlling the processor; and

the processor operative with the program to:
  generate a purchase price of a purchase;
  generate a rounded price;
  calculate a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;
  set a coupon value based on a predetermined multiple of the round-up amount; and
  print on the coupon an identifier that is based on the coupon value.

40. An apparatus for generating a coupon, comprising:

a storage device; and

a processor connected to the storage device,

the storage device storing a program for controlling the processor; and

the processor operative with the program to:
  generate a purchase price of a purchase;
  generate a rounded price;
  calculate a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;
  determine whether the purchase includes coupon redemption; and

if the purchase includes coupon redemption,
  set a coupon value based on the round-up amount, and
  print on the coupon an identifier that is based on the coupon value.

41. A computer-readable medium encoded with a program for implementing a method for generating a coupon, said processing instructions for directing a computer to perform the steps of:

generating a purchase price of a purchase;

generating a rounded price;

calculating a round-up amount, the round-up amount being a difference between the purchase price and the rounded price; and

printing on the coupon an identifier based on the round-up amount.

42. A computer-readable medium encoded with a program for implementing a method for generating a coupon, said processing instructions for directing a computer to perform the steps of:

generating a purchase price of a purchase;

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generating a rounded price;

calculating a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;

setting a coupon value based on the round-up amount; and

printing on the coupon an identifier that is based on the coupon value.

43. A computer-readable medium encoded with a program for implementing a method for generating a coupon, said processing instructions for directing a computer to perform the steps of:

generating a purchase price of a purchase;

generating a rounded price;

calculating a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;

printing on the coupon an indication of the round-up amount;

printing on the coupon an indication of an upsell;

receiving an indication of the round-up amount on a coupon; and

exchanging the round-up amount for the coupon.

44. A computer-readable medium encoded with a program for implementing a method for generating a coupon, said processing instructions for directing a computer to perform the steps of:

generating a purchase price of a purchase;

generating a rounded price;

calculating a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;

setting a coupon value based on a predetermined multiple of the round-up amount; and

printing on the coupon an identifier that is based on the coupon value.

45. A computer-readable medium encoded with a program for implementing a method for generating a coupon, said processing instructions for directing a computer to perform the steps of:

generating a purchase price of a purchase;

generating a rounded price;

calculating a round-up amount, the round-up amount being a difference between the purchase price and the rounded price;

determining whether the purchase includes coupon redemption; and

if the purchase includes coupon redemption,
  setting a coupon value based on the round-up amount, and
  printing on the coupon an identifier that is based on the coupon value.

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